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THE ΔΙΝΗ IN ANAXIMENES AND ANAXIMANDER

By W. A. Heidel

It has sometimes been doubted that Anaximenes believed in a *δίνη*. Zeller (I. 242. 4) controverts the contention of Teichmüller that the primordial motion of the Air was rotary. We might be content to accept Zeller's conclusion, if we could assume that Anaximenes distinguished between the primordial motion of the infinite Air and the original motion in the cosmos. But this assumption, made without definite evidence, would be extremely hazardous in the case of so early a thinker. Within the cosmos Zeller, though not without misgivings, is willing to accept the *δίνη*, regarding Anaximenes as the first to advance this view. In support of a *δίνη* in the system of Anaximenes we may offer the following considerations.

1. When Simplic. *Phys.* 24. 26 (*Dox.* 477. 4), following Theophrastus, says, *κίνησιν δὲ καὶ οὗτος* (as well as Anaximander) *αἴδιον ποιεῖ, δι' ἣν καὶ τὴν μεταβολὴν γίνεσθαι*, he doubtless referred to rotary motion; cf. Arist. *Cael.* 286 *a*. 9, *θεοῦ δ' ἐνέργεια ἀθανασία· τοῦτο δ' ἐστὶ ζωὴ αἴδιος. ὥστ' ἀνάγκη τῷ θείῳ κίνησιν ὑπάρχειν. ἐπεὶ δ' ὁ οὐρανὸς τοιοῦτος (σῶμα γάρ τι θεῖον), διὰ τοῦτο ἔχει τὸ ἐγκύκλιον σῶμα, ὃ φύσει κινεῖται κύκλῳ ἀεί.* This conception was ancient; cf. Alcmaeon, fr. 2 (Diels) and Diels *Parmenides Lehrgedicht*, p. 67.

2. [Plut.] *Strom.* 3 and Hippol. i. 7. 3 use the verb *ἐποχεῖσθαι* of the earth supported by the air, clearly implying that it is *borne by air in motion.*[1] The earth and the stars so borne are thin disks (Hippol. *ibid.* and Arist. *Cael.* 294 *b*. 13). These phenomena we are doubtless to conceive as analogous to that of leaves caught up by a whirlwind, cf. Arist. *Cael.* 295 *a*. 11.

3. Hippol. i. 7. 6 *οὐ κινεῖσθαι δὲ ὑπὸ γῆν τὰ ἄστρα λέγει, καθῶς ἕτεροι ὑπειλήφασιν, ἀλλὰ περὶ γῆν, ὡσπερεὶ περὶ τὴν ἡμετέραν κεφαλὴν στρέφεται τὸ πιλίον.* Here it is clearly assumed that there is a

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[1] Cf. Diog. Laert. ix. 30 (speaking of Leucippus): *τὴν γῆν ὀχεῖσθαι περὶ τὸ μέσον δινουμένην· σχῆμά τε αὐτῆς τυμπανῶδες εἶναι.* Cf. also Diels *Dox.*, pp. 46, 329 test. *b* 3.

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general rotary motion in a horizontal plane, the circling diurnal movement of the heavens centering in the earth. Our ancient sources appear to confound two things in themselves sufficiently distinct: (*a*) position at the center of a circle (due to rotation in a plane) and (*b*) position at the center of a sphere. In spite of the allusions to Anaximander's *σφαῖρα* and the spheres of the stars, I incline to think that the introduction of the scientific conception of the cosmos as a sphere was due chiefly to the Pythagoreans. The rotary motion in a plane accounts only for the position of the earth at the center of the *δίνη*, and not for the failure of the earth to fall in space. The latter problem does not seem to have troubled Anaximenes; he might equally well have inquired why the cosmos does not fall. The remarks of Arist. *Cael.* 294 *b.* 13 ff. must therefore be taken as applying chiefly to Anaxagoras.

4. Diog. Laert. ii. 9 says of Anaxagoras: *τὰ δὲ ἄστρα κατ' ἀρχὰς μὲν θολοειδῶς ἐνεχθῆναι, ὥστε κατὰ κορυφὴν τῆς γῆς τὸν ἀεὶ φαινόμενον εἶναι πόλον, ὕστερον δὲ τὴν ἔγκλισιν λαβεῖν.* In the first of these positions Anaxagoras, as we see, agreed with Anaximenes. The latter can not well be thought ignorant of the inclination of the ecliptic, the discovery of which is variously assigned to Anaximander or to Pythagoras. It is possible, therefore, that Anaximenes, like Anaxagoras, referred to the *original* motion of the stars. The mistake, if mistake there was, may have been due to the explanation he offered of the setting of sun and stars. But clearly such an explanation was possible even if he accepted a present inclination of the earth, since the phenomena to be explained are the same in any case. At all events, it is not without interest to note the close connection of two opinions—the inclination and the disk-shape of the earth. All of those philosophers—Empedocles, Anaxagoras,[1] Diogenes, Leucippus, Democritus—whom the doxographers quote on the first head were likewise agreed on the second. The inference would seem to be clear. The disk-shape of the earth was supposed to be due to the action of a rotary cosmic motion oper-

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[1] Archelaus also should be included; for according to him the earth is a disk, raised at the circumference and hollowed at the center. Cf. Hippol. i. 9. 4 (*Dox.* 563. 27). His view of the inclination is particularly interesting and suggestive; cf. Hippol *ibid.*: *ἐπικλιθῆναι δὲ τὸν οὐρανόν φησι, καὶ οὕτως τὸν ἥλιον ἐπὶ τῆς γῆς ποιῆσαι φῶς κα. τὸν ἀέρα ποιῆσαι διαφανῆ καὶ τὴν γῆν ξηράν. λίμνην γὰρ εἶναι τὸ πρῶτον.*

ating in a plane and collecting the sediment (so to speak) of the *ἔκκρισις* at the center. See *Philosophical Review* XIV, p. 71.

I have taken Anaximenes first because his case is comparatively strong. Zeller, as we have seen, inclines to accept the *δίνη* as the discovery of Anaximenes, thus denying the notion to his predecessor Anaximander. We may now enumerate several considerations which lend support to the contrary view.

1. Simplic. *Phys.* 24. 13 (*Dox.* 476. 13): *οὗτος δὲ οὐκ ἀλλοιουμένου τοῦ στοιχείου τὴν γένεσιν ποιεῖ, ἀλλ' ἀποκρινομένων τῶν ἐναντίων διὰ τῆς αἰδίου κινήσεως.* As was said above, *κίνησις αἴδιος* implies rotary motion. And, besides, the whole range of Greek philosophy connects *ἀπόκρισις* and *ἔκκρισις* with the *δίνη*.[1]

2. The earth has the disk-shape; cf. Hippol. i. 6 (*Dox.* 559. 23 f.).

3. Arist. *Cael.* 295 *b.* 10: *εἰσὶ δέ τινες οἳ διὰ τὴν ὁμοιότητά φασιν αὐτὴν* (*sc.* *τὴν γῆν*) *μένειν, ὥσπερ τῶν ἀρχαίων 'Αναξίμανδρος.* It is evident that Anaximander couched his explanation of the position of the earth in rather vague terms. This is proved by the interpretations offered by Aristotle and Theophrastus. The former in attempting to illustrate the thought alludes to the argument familiarly known as "Buridan's ass." This is hardly more absurd than the phrase used by Theophrastus (*apud* Hippol. i. 6. 3) *διὰ τὴν ὁμοίαν πάντων ἀπόστασιν.* It may be taken for granted that Anaximander was placing the earth in a circle rather than in a sphere. Assuming the *δίνη* as established, it would seem most natural to understand him as attributing the central position of the earth to the uniformity of the surrounding strata—water all around, air next, and fire at the periphery, each in a uniform circle.[2]

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[1] Theodoretus iv. 16: *οἱ δὲ τρόχου δίκην περιδινεῖσθαι* (*sc.* *τὸν κόσμον*). Diels *Dox.*, p. 46 refers this to Anaximander.

[2] This interpretation receives some support from two passages in Plato, namely *Tim.* 62 *e* ff. and *Phaedo* 109 *a*, although the argument here relates to position at the center of a sphere. In Plato the earth is of course a globe, and as such *ἰσόρροπος* or *ἰσοβαρής*, or as was said of the *Ὂν* of Parmenides, *πάντῃ ὅμοιος.* The statement of a similar view on the part of Parmenides *Aet.* iii. 15. 7 points to the same interpretation. The fact that in this latter passage Democritus is coupled with Parmenides is instructive as to the confusion, above noted, between position at the center of a circle and of a sphere. Democritus regarded the earth as a disk; Parmenides, as a globe. The explanation of the inclination of the earth to the ecliptic ascribed to Democritus (*Aet.* iii. 12. 2: *διὰ τὸ ἀσθενέστερον εἶναι τὸ μεσημβρινὸν τοῦ περιέχοντος*) is interesting as suggesting, by way of contrast, what was meant by *ὁμοιότης.*

4. The argument of Zeller (I. 223. 2) against the assumption of a *δίνη*, based on the supposed opinions of Anaximander touching the stars, is far from conclusive. It is by no means certain that Anaximander held the views mentioned by Aristotle *Meteor.* ii. 353 *b*. 6 ff. But assuming that Alexander was correct in referring them to Anaximander, the vague use of the word *τροπαί* and the inclusion of the planets among the "stars" in early times suggest the need of caution on the part of the historian.

These considerations appear to make it very probable that the cosmic *δίνη* was one of the original conceptions with which Greek philosophy attempted to explain the origin of things; that it was all but universally accepted by subsequent thinkers is a matter of common knowledge.

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